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ABSTRACT

This issue of the newsletter of the American Association for the Advancement of Science (AAAS) is devoted to reports by seven members of the AAAS Consortium of Regional Environmental Education Councils, as well as other miscellaneous environmental news. Each report includes information on the progress of environmental education in that region and a listing of program directors and their addresses. The second part of this newsletter is a collection of short articles concerning the metric system. Based on the prevailing interest in the International System of Units in the United States, the articles favor including metric education in the school curriculum. (MA)

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SCIENCE EDUCATION NEWS

American Association for the Advancement of Science

DEC 13 1974

November 1974

U.S. DEPARTMENT OF HEALTH
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EDUCATION

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Reports of Members of the AAAS Consortium of Regional Environmental Education Councils

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An environmental conscience has been completely integrated into the philosophy of the Cleveland Museum of Natural History since the Museum was incorporated in 1920. Today concern for our biosphere permeates every aspect of our total program.

One outgrowth of this concern was the creation of the Environmental Information Services, a completely volunteer program. Its original purpose was to assemble a comprehensive collection of material pertaining to the environment, to make this information more readily available to the public, and to serve as a referral center to pertinent agencies. An extensive newspaper clipping file and a publications file were cataloged and an index to pertinent magazine articles was compiled. In June 1970 the first of a series of environmental newsletters was published.

Concern for the balance of our ecosystem swept the nation in the early 1970s. The news media and scientific literature were peppered with information about the environment, ecology, and pollution. Most of this reporting was negative. The Environmental Information Service felt an urgent need for positive reporting.

The individual is the lowest common denominator in the environmental equation and herein lies the hope for the future. It is the individual who must be motivated to seek answers, to develop attitudes, to become involved. This is the prime target of the thrust of the Environmental Information Service. Questions directed to the service revealed an urgent desire for citizen participation: What were individuals doing? What contributions had they made? What avenues of action were open to them to help improve their own communities?

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The Environmental Information Service then surveyed the northeastern Ohio area, attempting to ferret out all the positive environmental actions and activities that were taking place at a grass roots level. As a result of this survey, a method of reporting this wealth of information was devised.

The exhibit "The Survival of Tomorrow's Environment Needs Your Involvement Today" was installed in a prominent location at the Museum in the Sears Hall of Man's Ecology in December 1972. This exhibit includes a map of northeastern Ohio, a legend, a directory cataloging all the survey information, and a bulletin board for news clippings of an immediate nature. The legend identifies principal activities for each municipality by a color code. The categories covered are recycling, no-litter, beautification, conservation, organic gardening, pest control, urban rehabilitation, education, and research. The directory is an alphabetical index of these municipalities listing the following: the organization, a capsule description of the activity, a contact person, and a telephone number. This exhibit is continually updated and is used constantly by visitors to the museum.

There is excellent communication and cooperation between the environmental groups in the Greater Cleveland area, and a major attempt is made to avoid duplication of services. An Ecology Calendar is published in the *Sunday Plain Dealer* by the Junior League of Cleveland. All recycling listings are referred to the librarian of the Cleveland Museum of Natural History for additional information. The Museum serves as a data bank for northeastern Ohio in the field of recycling.

This issue of *Science Education News* focuses on two current concerns in education. The articles on Environmental Education include reports from seven members of the Consortium of Regional Environmental Education Councils, which is sponsored by the Office of Science Education of AAAS.

The articles on Metric Education indicate a growing interest in this area as it seems likely that the United States will soon change to the International System of Units (SI). The metric system was made legal in the United States by an Act of Congress 108 years ago. —A.H.L.

In 1974 a wallet card, the Environmental Activator, was developed for the Greater Cleveland area. This was a joint project of the Cleveland Museum of Natural History and the Cleveland Press. This wallet enclosure was intended to encourage individuals to convert intention into action and contained the following information: where to learn the facts, how to register your opinions, a listing of addresses and phone numbers of state and federal officials, where to report violations, a list of environmental hot lines, and the names of action groups who welcome volunteer participation. All this is on a small folded triptych that fits in a wallet.

The Environmental Information Service continues to develop ideas that can be used as environmental teaching tools by school classes and regular museum visitors.

Cleveland Magazine in April 1973 had this to say about the program. "The Environmental Action directory exists to make it more convenient to do some things that can no longer be thought of as inconvenient."—MARY LOU FERBERT, *Associate of the Cleveland Museum of Natural History, and Coordinator, Environmental Information Service, Wade Oval, University Circle, Cleveland, Ohio 44106.*

Environmental Education Center

The Environmental Education Center (EEC) at Portland State University has been named a national demonstration center by the Division of Technology and Environmental Education of the U.S. Department of Health, Education, and Welfare. As a national demonstration center the EEC will work to extend the EEC model and services to a larger audience.

The EEC development began three years ago with a futuristic vision; with the practical need to provide information and communication services to the Portland community; and with funding assistance from the Environmental Education Act. Director Don Stotler's positive vision of future education included a new kind of institution which would help make the life-long process of environmental education a reality for more people. He saw the need for people-oriented, community self-learning centers that could provide people, information, and communication resources that would involve the learner in generating, exploring, and testing alternatives within his environment. Last year the EEC logged around 1,000 visitors and 300 volunteer hours per month.

In the EEC experiment both the development process and the product are essential to the model. The EEC is a physical place with a comfortable, warm environment, open access to volunteer and paid staff, and hands-on interaction with information stored on video tape, computer disks, and visually attractive files.

The process by which the EEC site and services is evolving was once called barn-raising and is now formalized as citizen participation. EEC rooms have been planned and designed by groups ranging from volunteer professional architects to high school students. Transforming the 4,000+ square feet of laboratory into a great place to be and an effective 3-D environmental

awareness demonstration cost around \$6,000 and thousands of donated hours, supplies, and tools. All kinds of users, from kids to professionals, continue to work with staff to clarify their information needs and to design and build systems to gain access to information sources. Although it is not always true, most information requests can be answered with existing resources. This effort to share information reduces duplication, unburdens overused resources, and encourages communication among the many information sources and between sources and users.

The new EEC newsletter RAIN shares the same goals as those services on-site. RAIN takes no sides on environmental issues, focuses on positive alternatives, provides access to existing resources, and will develop and improve through user participation in both content and format.

The staff feels that some of the reasons for EEC success include: a broad positive vision of the future that could be shared by potential EEC users; a generally recognized need for information services that could be provided by the EEC; the involvement of potential users in EEC development; a built-in evolution process in response to user and environmental feedback; and a simultaneous effort to develop both the EEC and an environment in which the EEC and other similar centers could be most useful.

The EEC could not function without the access to outside information resources and the cooperation from other groups, just as our Tektronix donated computer graphics terminal could not function without the donated computer time. ECO-NET is the code name for work to identify and build communication and cooperation links with other information sources and users. ECO-NET is exploring the environmental network that we are all a part of in several ways—through the newsletter, through exchange of video equipment and tapes, through an innovative computer-assisted people access, through a revival of the 18th century salon meeting style, and through catalyzing the process whereby people learn to trust each other and work together on mutually beneficial tasks. The EEC with its status as information service and educational experiment is uniquely suited to encourage the cross-discipline, cross-institutional, and cross-geographic tasks necessary at a time when problems seem to be changing faster and growing larger than our problem-solving institutions.

One of the main EEC activities during the next year will be assisting the development of this kind of cross-boundary task. Educators have identified the need to provide students with more real world experience; students, the need for more meaningful projects; and regulatory agencies, the need for accurate environmental quality data. The EEC is exploring with numerous public agencies, industry, and advocacy groups the possibility of involving kids in an environmental education project which would also produce useful data on water quality, noise levels, coastland conditions, air quality, and urban neighborhood life. The EEC is working to extend existing test projects to more districts, kids, and teachers to apply the model to gather

ing data on other environmental parameters, and to include an environmental career education component.—**LAURA WILLIAMSON**, *Manager, Environmental Education Center, 373 Lincoln Hall, Portland State University, P. O. Box 751, Portland, Oregon 97207.*

Maine Environmental Education Project

The concept of environmental education continues to become an integral part of education in Maine at all levels. Latest developments include the following:

The Maine State Plan for Environmental Education has been completed, published, and widely disseminated. This is the product of four years of efforts by a writing committee appointed by the State Commissioner of Educational and Cultural Services and input from over 500 draft readers. Preliminary steps are currently being undertaken to implement its major recommendations.

The Maine Environmental Education Project has been funded under Title III, 306, as a National Developer/Demonstration Project. This statewide project, now in its fifth year, has established environmental education programs in school systems across the state and it has assisted in the development of programs with the State University System for teachers at preservice, graduate, and inservice levels. Currently the project is engaged in (1) the revision and testing of its approaches and materials; and (2) their demonstration in workshops in Maine as well as throughout the United States for teachers, administrators, and state agency specialists. It is also working closely with its model program in the Yarmouth, Freeport, and Cumberland-North Yarmouth schools and, with a specially funded Title III, 306, adopter program, in the Calais, Maine, school system.

The University of Maine at Portland-Gorham and the Maine Association of Conservation Commissions have sponsored two projects with significant potential for environmental education in Maine. One funded under Title I of the Higher Education Act is a Community Natural Resources Inventory Project. Aimed at conservation commission and planning board members, this project is developing and pilot testing a course to enable citizens to compile and interpret data in written and map form, useful in town planning. Products of the project will include a cadre of citizens knowledgeable about and committed to community planning, a natural resources inventory course syllabus with related materials, and published inventory manuals for each participating community.

A second project funded under the Environmental Education Act utilizes a watershed approach to educating grade school students and community officials about their environment and its problems. Six school systems are currently involved in water monitoring in the Presumpscot River watershed to supply data to the State Department of Environmental Protection. An economic impact study is also being undertaken of the area, particularly the estuary, to gather data useful to agencies and organizations in the program. Also, an

educational program is being developed for conservation commission and planning board members to assist them in giving consideration to the total watershed in their local planning decisions.—**DEAN B. BENNETT**, *Codirector, National Developer/Demonstration Program, Maine Environmental Education Project, Intermediate School, Yarmouth, Maine 04096.*

Minnesota Environmental Sciences Foundation, Inc.

Environmental education in Minnesota is becoming regionalized following the pattern set by the various state agencies which maintain outstate offices in an attempt to better serve the citizenry. With regionalization a reality, the Minnesota Environmental Sciences Foundation, Inc. (MESFI), has become involved in research and development activities which focus on regional problems using the regional structure as an entrée into the non-formal environmental education process heretofore neglected because of the emphasis on institutionalized education. Under a grant from USOE, MESFI is assisting regional environmental education councils (REECS) in conducting three pilot citizen values and action seminars which could be models for future citizen problem-solving activities. Three premises underlie this program. They are:

1. Many groups, particularly planning and environmental commissions, are making and/or influencing community environmental decision making *now*.
2. Making environmental choices involves making value judgments. There is little or no opportunity for citizen groups to receive training in this process.
3. Citizen groups need a simple environmental impact assessment process that they can use in establishing priorities for environmental action alternatives.

The outcome of this program will be the development of an environmental assessment process guide that can be used by citizens with nonscientific backgrounds. The guide will be designed to help citizen's groups make a more substantial contribution to environmental decision making than most are now prepared to do. At the very least, people will be able to isolate pertinent environmental factors and interrelationships which will help them know what questions to ask.

MESFI's specific role in the process is to help others clarify their own goals as they relate to issues and to overlay this process with a communications structure which minimizes conflict and hostility and maximizes information exchange and constructive action. The alternatives MESFI is trying out are designed to provide citizens with an objective approach to the issues, once subjective goals and values are established openly in a controlled situation.

This latter point is an important one. One way of looking at the community is to see it as an aggregate of special interest groups. We have found that these groups and memberships have not clarified their own goals and values. Thus when community issues arise there is immediate divisiveness among groups because

they do not understand their own or other's positions. Once positions are known, they can be dealt with.

Preliminary findings indicate that citizens do need assistance with an environmental fact-finding and evaluation process. Equally important is the need for a group to establish criteria by which it can judge its success before it implements whatever action it chooses.

MESFI's work in the area of citizen problem-solving hopefully will lead to more rational and systematic decision making. It is a recognition of the need to involve citizens in the decisions that affect the quality of their lives. It is also perceived as a way to help citizens overcome apathy and feelings of helplessness which so often set in when they are confronted with bewildering and conflicting information surrounding issues. Thus if effective decision making can in fact be reduced to the application of certain skills, MESFI believes that these skills can be taught citizen decision makers who in turn can use them with both confidence and competence as they seek to better the environment in which they live.

—BARBARA B. CLARK, *Assistant to the Executive Director, Minnesota Environmental Sciences Foundation, Inc., 5400 Glenwood Avenue, Minneapolis, Minnesota 55422.*

A Model Educational Program in Ecology

Much of the information in environmental education today quite naturally belongs in the domain of science teaching. A problem suggested by the slow pace of change in human action is that as teachers of science charged with presenting the physical and biological foundations for understanding the environment, we may be guilty of presenting too much of a reductionist's view of the world. Fractionation and specialization are paramount to most scientific endeavors; they appear to be requisites of mastery. Young students, however, may be seeking a sense of intellectual closure about many phenomena in their surroundings that is frustrated by narrowed domains. Carrying capacity may be a concept relevant in period I biology, but the learner often fails to recognize that the same principles are as applicable to land use and human resources in period III social studies. He may want to "get it together" but may not know how.

Our initiating view was that environmental education can be a synergistic point of reference which is applicable to most disciplines. Our project in the Los Angeles Unified School District, the Model Educational Program in Ecology (ESEA, Title III funds), is focused on developing a systems approach for teaching environmental concepts. The program postulates that, in the present school setting, pupils encounter ecology-related concepts in a number of subject fields, each field embracing a traditional perspective of the meaning of ecology; that an interdisciplinary approach with planned sequential units, will produce a significant increase in pupil cognition and in pupil actions which demonstrate attitudinal change.

A key word is *demonstrate*. Instructional packages (learning activity modules) must be field tested in a

realistic school setting to see whether, in fact, they produce the changes anticipated. We must have statistical evidence of a mean change score among experimental groups significantly greater than the control mean. A pre-post-control group design is used for evaluation in which both experimental and control groups are selected at random from a pool of classrooms in the district. We cannot request volunteers from among those who would "like to do ecology." Demonstrated success in experimental groups, randomly selected from district teachers and their classes, is an important factor for program validity.

The basic conceptual structure for our overall framework and our set of program objectives is Ekistics: The Study of Man in His Environment, a Title V project in the state of California, developed under the chairmanship of Paul Brandwein. It employs the three pathways of science, the social sciences, and the arts and humanities for sequential curricular experiences. One early decision was the production of Learning Activity Modules, reinforcement for which has been gleaned from the experiences of such science projects as the Science Curriculum Improvement Study and *Science—A Process Approach*. All materials must be included in a kit and be convenient for the teacher.

We have made a conscious effort not to lock teachers into one specific sequence or limit them to a grade level. Level 2, for instance, though generally intended for grade 2 children, can be used in other grades since there is a reading level gradient built into the extended activities. We also urge the teachers to understand that the sequences are not locked forever in concrete. As new instructional materials and ideas develop, the teacher should make course corrections.

Without question, time is running out on Man. The mere existence of principles of ecological survival in books has not stimulated sufficient course corrections in Spaceship Earth. We think that schools have the greatest potential for making societal changes. Those who teach science, at all levels, bear the obvious responsibilities of establishing a cognitive base for awareness and of relating it holistically to man's survival.—GRANT R. CARY, *Coordinator, Model Educational Program in Ecology, Laurel Ecology Center, 1044 N. Hayworth Avenue, Los Angeles, California 90046.*

New Jersey State Council for Environmental Education

A 1972 survey of all school districts in New Jersey indicated that the major obstacles to installation of environmental studies were (1) lack of qualified staff and (2) lack of curriculum materials. In its activities the New Jersey State Council for Environmental Education sought to respond to these needs.

In a large-scale outreach program to meet the need for trained staff, the council purchased the copyright to "Man and Environment," a series of 15 television documentaries. The council supplemented this with teacher's and inservice guides and arranged with the New Jersey Public Broadcasting Authority and the

Public Broadcasting Service to televise these programs on a semester schedule, five times each week. Among the state's colleges, the "Man and Environment" course offering has been coordinated with courses in environmental education, science and society, and teacher training. In the local school districts, it is used for inservice programs and special studies.

The call for curriculum materials required extensive curriculum development and production of the Environment and the Quality of Life series containing units on population, natural resources, industrial-economic impact, pollution, land use, a river basin, pinelands, wetlands, energy-technology, energy-society, energy-transportation, primary ecology, and environmental law.

These units are designed to: use data and concepts from the social as well as the physical and biological sciences; meet the needs of teachers and students in urban areas; focus on real problems relating to science, society, economics, physical and psychological health, values and group psychology associated with environmental problems; provide students the opportunity to exercise critical skills and clarify values; be used for small group or individual instruction; and be easily revised or updated. The series is now available as Computer Based Resource Units (CBRU's): rapidly retrievable, tailored to specific needs, and accessible to all New Jersey teachers.

The underlying attraction of the CBRU system is that it allows teachers and students to select objectives (coded to student interests) from a long list of alternatives. Guides may be ordered for both the class and individual students. The material is readily adaptable to each teacher's methods of preparation and to indi-

vidualized instruction, remediation, and enrichment. Another great advantage of CBRU's is their potential for being rapidly updated with new information.

The key to success of these materials, however, will be the skill of the teacher in planning and ordering objectives with students and in cooperative selection of the activities in which the youngsters will engage.—EDWARD J. AMBRY, *Director, New Jersey State Council for Environmental Education, Montclair State College, Upper Montclair, New Jersey 07743.*

Quality Environment Council of Nebraska and Western Iowa

On 23 September 1974 Quality Environment Council, a group of private citizens dedicated to environmental improvement in the Omaha, Nebraska, area sponsored a conference-workshop entitled "Clean Water—The Citizen's Role." The meeting was supported by an authorization from the Environmental Protection Agency and dealt specifically with the role the citizen can play in effecting provisions of Public Law 92-500, the Federal Water Pollution Control Act Amendments of 1972.

QEC's interest in public education was further illustrated in its participation in televised hearings of two legislative committees. These hearings had to do with a proposed and already authorized Corps of Engineers flood-recreation project of 20 dams on a small creek system (the Papillion Creek and tributaries) lying just west and north of Omaha.—GEORGE E. GRUBE, *Quality Environment Council of Nebraska and Western Iowa, Dana College, Blair, Nebraska 68008.*

Miscellaneous Environmental News

Ohio Academy of Science and Environmental Education

Fortunate are Ohio teachers this fall as they discover the fresh new environmental education materials published by the Ohio Department of Education. These were designed to assist schools in implementing an interdisciplinary approach to this subject. The first to appear was an introductory pamphlet entitled *Environmental Education: Why? What? and How?* prepared by Robert Roth, Director, Environmental Education, School of Natural Resources, Ohio State University. The Center for the Development of Environmental Curriculum, Willoughby, Ohio, produced three very practical and adaptable booklets, *Environmental Learning Experiences*, one for grades K through 2, one for grades 3 and 4, and a third for grades 5 and 6. *Environmental Learning Resources*, an annotated catalog describing classroom aids and reference material for teachers was published along with the *Learning Experiences*. Published in a limited number was an exciting series of learning experiences for planning junior and senior high school curricula. Ron Reed, Director of the Mohican School of the Outdoors, was responsible for a succinct bulletin, *Resident Outdoor Education, A Planning Guide*.

As part of the undertaking, the department con-

tracted with the Ohio Academy of Science under the direction and authorship of Ruth W. Melvin, Environmental Education Consultant for the Academy, to prepare a resource book which evolved into an illustrated publication entitled *Ohio Environmental Education Areas*. The book includes detailed field studies in each of Ohio's five major watershed regions, studies in resource management, land use, reclamation, and the quality of air, water, and soil. Power plants, a tire company, a pottery, a model community, a glass factory, a paper mill, a paint company, an exemplary farm, a waste water treatment plant, a steel mill, a strip mine, natural areas and nature centers where environmental education is important, represent the wide variety of models available for detailed environmental assessment. Each region is prefaced with a comprehensive overview of the biophysical environment, the socio-cultural development of the area beginning with the Paleo-Indians, and the economic progression with its environmental impact.

An unusual introduction, *Reading Ohio's Landscape*, encompasses background information concerning the state as a whole. Outstanding writers in the fields of geology, glaciology, soils, water, mineral resources, forests, wildlife, natural area preservation, man's impact on the environment and Ohio's future landscape,

contributed concise descriptions which, along with the appropriate colored maps, give teachers easy access to a wealth of information.

The beautiful colored photographs enhance the volume considerably and the glossary, references and index make it very usable. The writer is anxious that her own admonition, an old New England adage quoted in the introduction, "Eat it up, wear it out; make it do, do without," be applied to the use of the book as well as included in an environmental code of ethics of each user.

For resident and nonresident environmental educators requests for single copies of any of these materials may be directed to: Supervisor of Environmental Education, Ohio State Department of Education, 65 South Front Street, Columbus, Ohio 43215.—RUTH W. MELVIN, *Environmental Education Consultant, Ohio Academy of Science.*

Chesapeake Bay Center for Environmental Studies

The education programs of the Chesapeake Bay Center are designed to supplement and enrich the science curriculum of participating schools and to develop ecological awareness in people of all ages. A salt marsh, a brackish river, a freshwater creek, abandoned fields, and mature forests—this mosaic of habitats and vegetation types serves as a classroom for the Chesapeake Bay Center's education programs.

Programs: "Field Trips" are teacher-led activities focusing on specific concepts. "Drop-in-Tours" consist of short exercises selected from Outdoor Biology Instructional Strategies (OBIS) materials and led by the center's docent (volunteer) staff. The center also offers programs for adults, as well as a speaker's bureau, teacher workshop, summer ecology program for children, and an opportunity for teachers to develop their own programs at the center. In scheduling these programs, priority is given to groups in the area surrounding the center. The center will arrange tours for advanced groups or classes with special interests. All tours should be scheduled at least two weeks in advance.

For more information write to Dorothy Kinsman or John Falk, Chesapeake Bay Center, Route 4, Box 622, Edgewater, Maryland 21037.

ICSU Committees on Science Education and the Environment

The International Council of Scientific Unions (ICSU) is an organization of nongovernmental scientific organizations and academies of science in sixty countries. Recently three committees of ICSU have met to consider their common concern in science education. The three committees, COSTED (Committee on Science and Technology in Developing Countries), SCOPE (Scientific Committee on Problems of the Environment), and CTS (Committee on the Teaching of Science) are considering the possibility of launching a program whose tentative title is "Natural Resources and the Environ-

ment as Integrating Concepts in Science and Technology Education for Developing Countries."

During the ICSU General Assembly held in Istanbul last September, officers of SCOPE, COSTED, and CTS met to lay the groundwork for future collaboration.

The overall plan is to conduct regional seminars in different areas of the developing world in which local scientists and educators identify the regional problems of natural resource identification and the possible environmental impact of their utilization. On the basis of this information they hope to develop strategies, modules and teaching methods to be used in pilot curriculum experiments.

It is hoped that the first regional seminar will be held with some assistance from UNEP in Ghana in early 1975 under the auspices of the Ghana Academy of Sciences, possibly restricted to the topics of water and soil. Later, collaboration with UNESCO is envisaged.—Information provided by Albert V. Baez, Chairman CTS, Lawrence Hall of Science, Berkeley, California 94720.

AAAS Science Seminar for High School Students

The third annual science seminar for high school students in Jacksonville, Florida, started with car pooling on 21 October. This year's seminar focuses on the issue of mass transit in Jacksonville and all participants were

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asked to avoid reaching the Jacksonville Transit Authority building for the opening meeting as a lone passenger in a car.

William Fryar, Supervisor of Environmental Education in Duval County, had scheduled day-long activities as the 34 student participants met with representatives of the institutions involved in mass transit planning. These include the Jacksonville Transit Authority, the Jacksonville Planning Board, the Downtown Development Authority, the Florida Lung Association, and others. Present at this first seminar meeting was the president of the American Public Transit Association.

A third study is under way to critically assess the overall needs of the Jacksonville area in terms of transportation and the environmental impact of various transportation systems. The public hearings that will begin in early 1975 will be attended by the seminar students who will actively participate in raising questions and seeking answers.

In early December the second scheduled meeting of the seminar will be sponsored by the Downtown Development Authority. The students will be informed about downtown development plans for the next two decades. This meeting will focus on the transportation needs that are projected because of the development plans.

Early in 1975 the third meeting will be sponsored by the Air Pollution Control Board and the Florida Lung Association. These groups will present their concerns about the effect of auto emissions on the environment

and what impact future development will have in terms of auto emissions. Their concerns will serve as a basis for justification of a mass transit system and the students will study their concerns in terms of this justification.

Other meetings, to be held throughout the remainder of the school year, are still in the planning stages. Culminating activities are planned for near the end of the school year.

These seminars are cosponsored by the Duval County school system and the American Association for the Advancement of Science. For further information write to William Fryar, Supervisor of Environmental Education, Duval County School System, Francis Street, Jacksonville, Florida 32209.

Elementary Science Packets

The Elementary Packet Series project of NSTA continues. Still available from the early packets are those entitled "Measurement and the Metric System," \$3.00; "Environmental Education II," \$3.00; and "Drug Education," \$3.00. The current packet is entitled "Environment and Energy" at a price of \$2.00. In preparation are two additional packets, one focusing on health and nutrition and the other on multi-disciplines.

These packets are available from the National Science Teachers Association at its new home at 1742 Connecticut Avenue N.W., Washington, D.C. 20009.

Metric Education

Metric Publications

To assist educators interested in identifying metric materials the American Institutes for Research (AIR) has published a *Catalog of Metric Instructional Materials*. AIR also publishes a newsletter, *Metri-Gram*, devoted to educational implications of metrication, and *Going Metric: An Analysis of Experiences in Five Nations and Their Implications for U.S. Educational Planning*. Further information can be obtained from American Institutes for Research, Metric Studies Center, Department 30, P. O. Box 1113, Palo Alto, California 94302.

NCTM Metric Resolution

On 17 April 1974 the Board of Directors of the National Council of Teachers of Mathematics unanimously passed a resolution resolving "That the Congress of the United States be urged to pass immediately a metric bill which provides for an implementation program of not more than ten years."

Metrication in Canada

By 1977 all highway speed and distance signs in Canada will be in kilometers instead of in miles. Even earlier, weather forecasts in Canada will be reported in Celsius degrees. For a period of six weeks beginning in April 1975 reports will be given in both Fahrenheit and Celsius readings, but after that six-week period, only Celsius degrees will be used.—From *American Metric Journal*, Sept/Oct 1974.

The Mathematics Teacher

The November 1974 issue of the *Mathematics Teacher* includes several articles on the effect of metrication on mathematics education. Also included is a bibliography of recent articles on metrication and several sources of metric information. It is published by the National Council of Teachers of Mathematics, 1906 Association Drive, Reston, Virginia 22091.

National Association for Metric Education

The National Association for Metric Education was established in 1974 to provide high quality guidelines and instruction that are necessary to smooth the way for metric changeover in all sectors of society. Kenyon Y. Taylor is the chairman pro tem of the new association. Lola J. May is executive secretary. Arthur H. Livermore, AAAS Office of Science Education, is a member of the Board of Directors. For further information write to Lola J. May, Executive Secretary, National Association for Metric Education, Winnetka Public Schools, 1155 Oak Street, Winnetka, Illinois 60093.

AIR Metric Study

The National Institute of Education has recently announced a grant to the American Institutes for Research (AIR) for a six-month study of the role of the teacher in conversion to the metric system. In the study AIR will investigate training programs that proved helpful to British and Australian teachers when their countries

instituted the metric system. The study should provide education policy makers in this country with information that will be useful in considering the introduction of the metric system.—From *Information*, National Institute of Education, Washington, D.C. 20208.

A Survey of Scientific Associations

The staff of the AAAS Office of Science Education sent a short questionnaire to 100 of the 238 scientific societies that are affiliated with the American Association for the Advancement of Science to determine what some scientific and engineering associations are currently doing in metric education. The questionnaire asked whether the associations were producing educational materials for teachers, for students, for members of the association, or for the general public.

It is not surprising that the associations most active in producing educational materials for teachers and students as well as for members of the association and for the general public are the science and mathematics education societies. The engineering societies are the next most active. Seventy percent of the engineering societies responding said that they were producing educational materials for members of their societies. Although the biological, physical, and social science associations are not as active in producing educational materials, many of them commented that they have used metric units exclusively for many years in their publications.

The questionnaire also asked if the associations had a metric conversion committee and, if so, what the functions of the committee were. These functions were varied. Some of the committees had been established to advise and inform members of trends toward metrification in the United States; some were active in production of educational materials, such as slide cassettes and printed materials; and some held training courses for their members. Five associations reported that they did not have metric conversion committees, but they agreed that such committees would be desirable.

One of the social science associations stated that "we will explore the matter with our council now that you have reminded us of the challenge." One of the physical science associations commented that there should be a greater attempt to encourage scientists, who use the metric system in their work, to take a more active, public prometric stance.

ANMC Academic Task Force Survey

The Academic Task Force of the American National Metric Council has conducted a metric survey of 220 schools or departments of education across the U.S. Two major questions were asked: (1) What is your institution doing to prepare students to teach metric? and (2) What kind(s) of instructional materials are being used at your institution for teaching and/or using metric? The results of the survey indicated that more than half of those responding were actively preparing their students to teach metric, but that not all of these institutions were implementing instructional aids in this teaching process.

For further information about the ANMC Academic

Task Force metric survey, contact the American National Metric Council, 1625 Massachusetts Avenue, N.W., Washington, D.C. 20036.—From *National Council of Teachers of Mathematics Bulletin for Leaders*, November 1974.

Metric Education for Teachers

Based on the results of three surveys, including those described in the preceding two news items, the Metric Education for Teachers Committee of the American National Metric Council has recommended the following:

1. A central resource center should be established for collecting and disseminating information on metric materials. This national center should house examples of model preservice and inservice programs, instructional materials, and courses of study. Commercial as well as noncommercial items should be included.
2. Efforts should be made to capitalize on work being supported with public funds.
3. Educational associations should establish a working body within each organization to deal with metric activities.
4. Guidelines should be developed to meet the needs of teachers of various subjects and at different school levels.
5. Model teacher education programs, both preservice and inservice, should be developed and disseminated.
6. Multimedia materials should be developed for teacher education programs.
7. Working conferences in the area of teacher education should be held for the dissemination of the various guidelines, programs, and materials.

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